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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/502,435	06/09/2005	Boo-Gon Woo	YOM-0102	5935
530 7590 10/11/2007 LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK 600 SOUTH AVENUE WEST WESTFIELD, NJ 07090			EXAMINER SHIAO, REI TSANG	
			ART UNIT 1626	PAPER NUMBER
			MAIL DATE 10/11/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/502,435

Applicant(s)

WOO ET AL.

Examiner

Rei-tsang Shiao, Ph.D.

Art Unit

1626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) 4 and 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 06/05/06, 07/22/04
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This application claims benefit of the foreign applications:  
REPUBLIC OF KOREA 10-2002-0006585 with a filing date 02/05/2002 and  
REPUBLIC OF KOREA 10-2003-0002772 with a filing date 01/15/2003.
2. Claims 1-5 are pending in the application.

### ***Information Disclosure Statement***

3. Applicant's Information Disclosure Statements, filed on June 05, 2006 and July 22, 2004 have been considered. Please refer to Applicant's copies of the 1449's submitted herein.

### ***Responses to Election/Restriction***

4. Applicant's election with traverse of election of Group I claims 1-3, in the reply filed on July 30, 2007 is acknowledged. An election of a species, i.e.,  $\text{TiO}_2$ , as the single species is also acknowledged. The traversal is on the grounds that applicants submit that no search burden would be included in the search required for claim 1 by adding claims 4-5, and MPEP §706.04 is cited. This is found not persuasive, and the reasons are given *infra*.

Claims 1-5 are pending in the application. The scope of the invention of the elected subject matter is as follows.

Claims 1-3 are drawn to processes of making aromatic carbonate compounds.

The claims 1-5 herein lack unity of invention under PCT rule 13.1 and

Art Unit: 1626

13.2 since the compounds defined in the claims lack a significant structural element qualifying as the special technical feature that defines a contribution over the prior art, see Rechner et al. US 5,523,451. Rechner et al. discloses similar processes as the instant invention. Accordingly, unity of invention is considered to be lacking and restriction of the invention in accordance with the rules of unity of invention is considered to be proper. Furthermore, even if unity of invention under 37 CFR 1.475(a) is not lacking, which it is lacking, under 37 CFR 1.475(b) a national stage application containing claims to different categories of invention will be considered to have unity of invention if the claims are drawn only to one of the following combinations:

- (1) A product and a process specially adapted for the manufacture of said product, or
- (2) A product and a process of use of said product; or
- (3) A product, a process specially adapted for the manufacture of the said product, and a use of the said product; or
- (4) A process and an apparatus or means specifically designed for carrying out the said process; or
- (5) A product, a process specially adapted for the manufacture of the said product, and an apparatus or means specifically designed for carrying out the said process.

And, according to 37 CFR 1.475(c)

if an application contains claims to more or less than one of the combinations of categories of invention set forth in paragraph (b), unity of invention might not be present.

However, it is noted that unity of invention is considered lacking under 37 CFR 1.475(a) and (b). Therefore, since the claims are drawn to more than a product, and according to 37 CFR 1.475 (e)

Art Unit: 1626

the determination whether a group of inventions is so linked as to form a single general inventive concept shall be made without regard to whether the inventions are claimed in separate claims or as alternatives within a single claim.

The claims lack unity of invention and should be limited to only a product, or a process for the preparation, or a use of the said product. In the instant case, Groups I-II are drawn to various processes and products, and the products of reaction apparatus (i.e., claims 4-5) do not contain a common technical feature or structure of claims 1-3, and do not define a contribution over the prior art, i.e., similar aromatic carbonate. Moreover, the examiner must perform a commercial database search on the subject matter of each group in addition to a paper search, which is quite burdensome to the examiner. Claims 1-3 are prosecuted in the case. Claims 4-5 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention.

The requirement is still deemed proper.

#### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a process for preparing aromatic carbonate of the

Art Unit: 1626

formula 2 (i.e.,  $\text{ROCOAr}$ ) or formula 3 (i.e.,  $\text{ArOCOAr}$ ) using starting materials

dialkyl carbonate compounds of formula 1 (i.e.,  $\text{ROCOR}$ ), it does not reasonably provide enablement for a process for preparing aromatic carbonate other than compounds of formula 2 or 3 using starting material dialkyl carbonate compounds other than compounds of formula 1, see claim 1. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. Dependent claims 2-3 are also rejected along with claim 1 under 35 U.S.C. 112, first paragraph.

In *In re Wands*, 8 USPQ2d 1400 (1988), factors to be considered in determining whether a disclosure meets the enablement requirement of 35 U.S.C. 112, first paragraph, have been described. They are:

1. the nature of the invention,
2. the state of the prior art,
3. the predictability or lack thereof in the art,
4. the amount of direction or guidance present,
5. the presence or absence of working examples,
6. the breadth of the claims,
7. the quantity of experimentation needed, and
8. the level of the skill in the art.

Art Unit: 1626

In the instant case:

**The nature of the invention**

The nature of the invention is a process for preparing aromatic carbonate using starting material aromatic hydroxy compounds without limitation of final product and starting material (i.e., no formula), see claim 1.

**The state of the prior art and the predictability or lack thereof in the art**

The state of the prior art is that a similar process, wherein the aromatic carbonate represents compounds of formula (I), see column 3 of Rechner et al. US 5,523,451.

**The amount of direction or guidance present and the presence or absence of working examples**

The only direction or guidance present in the instant specification is the example compounds on pages 16-21 of the specification. There is no data present in the instant specification for the final products aromatic carbonate and the starting material dialkyl carbonate compounds without limitation (i.e., no formula).

**The breadth of the claims**

The instant breadth of the rejected claims is broader than the disclosure, specifically, the final products aromatic carbonate and the starting material dialkyl carbonate compounds are not limited (i.e., no formula).

Art Unit: 1626

**The quantity or experimentation needed and the level of skill in the art**

While the level of the skill in the chemical arts is high, it would require undue experimentation of one of ordinary skill in the art to resolve any aromatic carbonate or dialkyl carbonate compounds. There is no guidance or working examples present for constitutional any aromatic carbonate compounds using the starting materials dialkyl carbonate compounds without limitation for the instant invention. Incorporation of the limitation of the aromatic carbonate (i.e., formula (2) or (3)) and the dialkyl carbonate compounds (i.e., formula (1)) and aromatic hydroxy compounds (i.e., ArOH into claim 1 would overcome this rejection.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.1 Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Rechner et al. US 5,523,451.

Applicants claim a continuous process of making aromatic carbonate compounds using starting material dialkyl carbonate and aromatic hydroxyl compound in the presence of a heterogeneous catalyst, and the instant process is operated in a reactor/distillation column.

Rechner et al. disclose a continuous process of making aromatic carbonate



Art Unit: 1626

compounds (i.e., formula (I)) using starting material dialkyl carbonate (i.e., formula (II)) and aromatic hydroxyl compound or phenolic compounds (i.e., formula (III)) in the presence of a heterogeneous catalyst (i.e., mixed oxide of silicon and titanium), and the process is operated in a reactor/distillation column, see columns 2-3 and 9, lines 57-64 of column 14, and columns 16-18. Therefore Rechner et al. processes meet the required elements of the instant invention.

**6.2** Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Komiya et al. US 5,872,275.

Applicants claim a continuous process of making aromatic carbonate compounds using starting material dialkyl carbonate and aromatic hydroxyl compound in the presence of a heterogeneous catalyst, and the instant process is operated in a reactor/distillation column.

Komiya et al. disclose a continuous process of making aromatic carbonate compounds (i.e., formula (5) or (6)) using starting material dialkyl carbonate (i.e., formula (1) or (2)) and aromatic hydroxyl compound or phenolic compounds (i.e., formula (3)) in the presence of a catalyst (i.e., PbO), and the process is operated in a reactor/distillation column, see columns 7-8, 15, and columns 37-38. Therefore Komiya et al. processes meet the required elements of the instant invention.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 1626

7.1 Claims 1-3 are rejected under 35 U.S.C. 103(a) as being obvious over Rechner et al. US 5,523,451.

Applicants claim a continuous process of making aromatic carbonate compounds using starting material dialkyl carbonate and aromatic hydroxyl compound in the presence of a heterogeneous catalyst, and the instant process is operated in a reactor/distillation column.

**Determination of the scope and content of the prior art (MPEP §2141.01)**

Rechner et al. disclose a continuous process of making aromatic carbonate compounds (i.e., formula (I)) using starting material dialkyl carbonate (i.e., formula (II)) and aromatic hydroxyl compound or phenolic compounds (i.e., formula (III)) in the presence of a heterogeneous catalyst (i.e., mixed oxide of silicon and titanium), and the process is operated in a reactor/distillation column, see columns 2-3 and 9, lines 57-64 of column 14, and columns 16-18.

**Determination of the difference between the prior art and the claims (MPEP §2141.02)**

The difference between the instant claims and Rechner et al. is that the instant claims are silent on the formula (2) or (3) of the final product aromatic carbonate, while Rechner et al. represents aromatic carbonate compounds of formula (I). Rechner et al. processes overlap with the instant invention.

**Finding of prima facie obviousness-rational and motivation (MPEP §2142-2143)**

One having ordinary skill in the art would find the instant claims 1-3 prima facie obvious **because** one would be motivated to employ the processes of Rechner et al. to obtain the instant processes, wherein aromatic carbonate compounds are obtained by using starting material dialkyl carbonate and aromatic hydroxyl compound in the presence of a heterogeneous catalyst, and the instant process is operated in a reactor/distillation column.

It is noted that a chemical process being operated in a reactor/distillation column is known in the field of chemical reaction art. It is well established that substitution of a reactor/distillation column to another reactor/distillation column on a known process of Rechner et al. is not a patentable modification absent unexpected or unobvious results. Moreover, the product yields of aromatic carbonate compounds of Rechner et al. processes is >99.9%, see Examples 1-4 in columns 15-16.

The motivation to obtain the claimed processes derives from known Rechner et al. processes would possess similar yields to that which is claimed in the reference.

**7.2** Claims 1-3 are rejected under 35 U.S.C. 103(a) as being obvious over Komiya et al. US 5,872,275.

Applicants claim a continuous process of making aromatic carbonate compounds using starting material dialkyl carbonate and aromatic hydroxyl compound in the presence of a heterogeneous catalyst, and the instant process is operated in a reactor/distillation column.

**Determination of the scope and content of the prior art (MPEP §2141.01)**

Komiya et al. disclose a continuous process of making aromatic carbonate compounds (i.e., formula (5) or (6)) using starting material dialkyl carbonate (i.e., formula (1) or (2)) and aromatic hydroxyl compound or phenolic compounds (i.e., formula (3)) in the presence of a catalyst (i.e., PbO), and the process is operated in a reactor/distillation column, see columns 7-8, 15, and columns 37-38.

**Determination of the difference between the prior art and the claims (MPEP §2141.02)**

The difference between the instant claims and Komiya et al. is that the instant claims are silent on the formula (2) or (3) of the final product aromatic carbonate, while Komiya et al. represents aromatic carbonate compounds of formula (5) or (6). Komiya et al. processes overlap with the instant invention.

**Finding of prima facie obviousness-rational and motivation (MPEP §2142-2143)**

One having ordinary skill in the art would find the instant claims 1-3 prima facie obvious because one would be motivated to employ the processes of Komiya et al. to obtain the instant processes, wherein aromatic carbonate compounds are obtained by using starting material dialkyl carbonate and aromatic hydroxyl compounds in the presence of a heterogeneous catalyst, and the process is operated in a reactor/distillation column.

Art Unit: 1626

It is noted that a chemical process being operated in a reactor/distillation column is known in the field of chemical reaction art. It is well established that substitution of a reactor/distillation column to another reactor/distillation column on a known process of Komiya et al. is not a patentable modification absent unexpected or unobvious results.

The motivation to obtain the claimed processes derives from known Komiya et al. processes would possess similar yields to that which is claimed in the reference.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rei-tsang Shiao whose telephone number is (571) 272-0707. The examiner can normally be reached on 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph K. McKane can be reached on (571) 272-0699. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Application/Control Number: 10/502,435

Page 14

Art Unit: 1626

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'Rei-tsang Shiao', with a long horizontal flourish extending to the right.

Rei-tsang Shiao, Ph.D.  
Patent Examiner  
Art Unit 1626

September 12, 2007